

UNIFORM LOAD DISTRIBUTION ON THREE PHASE ALTERNATER AND ENERGY AUDIT OF AMGOI.

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Abstract –

Energy audit is the key to a proper approach for decision making in the area of energy management. The objective of energy audit is to determine way to reduce energy consumption per unit of product output. It involves analysis of energy use, collecting basic data by actual observation of field, cost benefit analysis of the data, action plan for implementation of saving measures etc.

This paper gives the basic concept and need of energy audit. In this paper energy audit of institution has been done. It includes analysis of institute energy usage, load distribution on each phase with phase checking, drawing of wiring diagram. After checking the load distribution on each phase, for unbalance phases remedial action has been suggested.

Key Words: Energy audit, load distribution, wiring diagram, balancing load, energy efficiency

I. INTRODUCTION:

Ashokrao Mane Group of Institutions was started in 2009 to promote Technical Education and Management studies in this part of Maharashtra State. The AMGOI Campus is comprised of Faculty of Engineering and Faculty of Management.

Now a day's energy audit is the main pillar of the developing world. So the excellent management of energy is necessary. Hence for this purpose energy audit concept is arising. Energy audit gives different way of utilizing the energy to give good energy efficiency as well as cost efficiency.

For energy auditing of institute, first we observed all over load distribution of our institution, electrical equipment, than we counted number of class rooms, computer rooms and labs. We calculated how many tubes, fans, computers and other electrical equipment in each room

and observe load in each class, lab. Find out which class or lab have maximum load. Also draw the rough wiring diagram of institute and then draw final wiring diagram of institute by using AUTO-CAD software. The aim of the paper was to a balance the three phase load of AMGOI, wiring diagram of AMGOI and also calculate the load calculation of institutions. The energy audit helps us for the implementation of improved power management techniques.

II. Energy Audit:

An energy audit is a study of system in which we find how and where energy is consumed and gives the solution to improve energy efficiency.

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a institution, process to reduce the amount of energy input into the system without changing the output.

Types of Energy Audit:

There are three types of energy audit as follows.

1. Preliminary Energy Audit.
2. General energy audit.
3. Detailed Energy Audit.

1. Preliminary Energy Audit:

This is the simplest and quickest type of audit. This type of energy audit requires less time as compared to other type of audit. It concentrates on a major energy supplies and load demands. It involves necessary steps for implementation to energy consumption. It requires collecting of basic necessary data analysis of energy use. This type of audit does not give detail information about the system.

2. General energy audit:

This type of energy audit is also known as mini audit. It collect more data and information than preliminary energy audit. In this type of energy audit auditor requires 12 to 36 months electricity bills for calculation of load demand and energy usage profiles. It gives accurate results for energy consumption than preliminary energy audit

3. Detailed Energy Audit:

This type of energy audit is known as complete energy audit. The main purpose of detailed audit is to reduce total energy cost and energy consumption. It saves 8 to 10 % electrical energy. It provides detail information about the load variation

III. Process of energy audit:

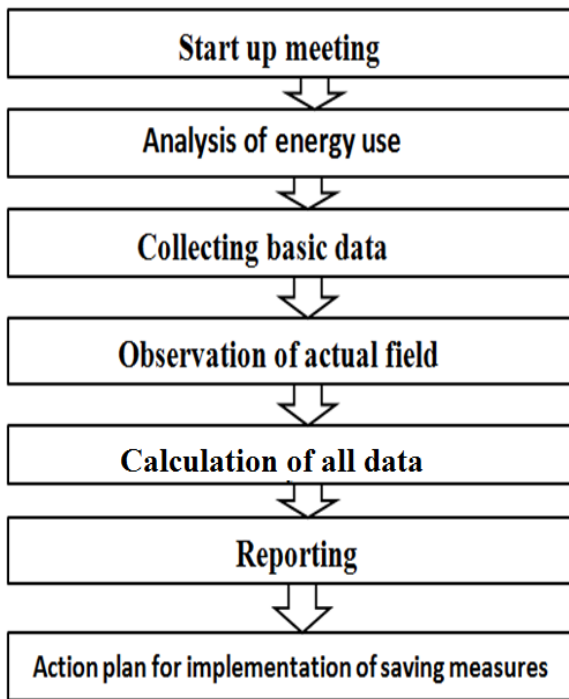


Figure 1- Process of energy audit

In first meeting we gathered and decided how to work on energy audit of AMGOI. After that we analyse the energy consumption in each class room and labs. All energy consumption equipments counted. In collecting the basic data first we count number of class rooms and labs. by using this basic data we calculate total number of tubes, fans, computer, printer etc. In obervation of actual field we observe supply from generator and load distribution of each department. After complition of observation calculate equipment and department wise load consumption.

IV. Data collection:

The load distribution panel of AMGOI as shown in figure 2. The input from MSEB is connected to the main supply. The change over switch is used, when power from MSEB is switched off then power taken from generator. The load distributed in wing A, wing B, civil workshop, polytechnic, electrical lab degree office and mechanical workshop.

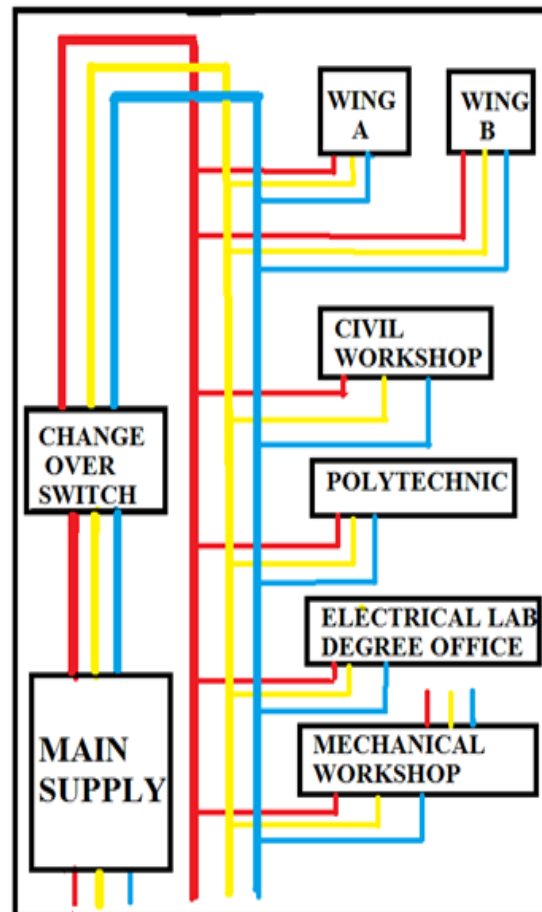


Figure 2- load distribution of AMGOI

Equipment wise load consumption of institute:

This is the equipment wise load consumption in AMGOI institute. It includes all the department, workshop. From the following load analysis light

consumes the maximum load and AC and Xerox machine consumes minimum load.

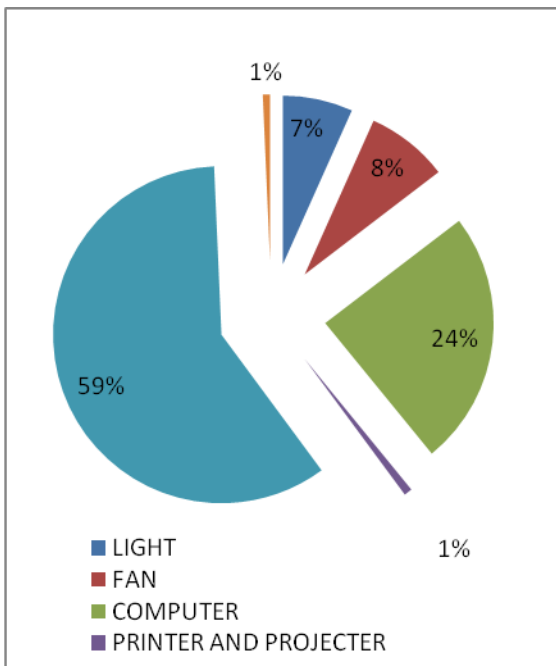


Figure 3- Equipment wise load distribution

Department wise load consumption of institute:

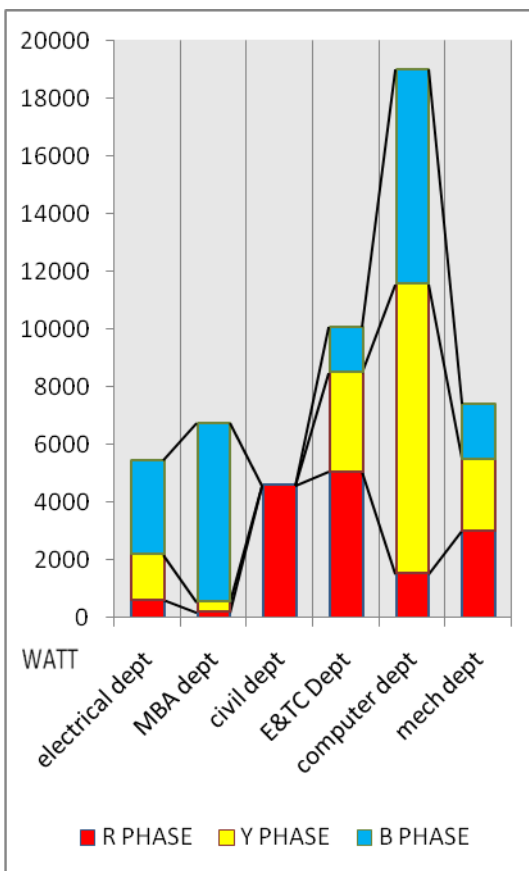


Figure 4-department wise phase load.

The figure 4 shows graphically representation of department wise phase wise over all load distribution. From this load analysis computer department consume maximum load and civil department consume minimum load.

Total Connected Load for different Usage in kWh:

	LIGHT	FAN	COMPUTER	PRINTER AND PROJECTOR	MOTOR	AC AND XEROX MACHINE
Ground floor	3.6	3.2	7.8	0.5	47.8	0.96
First floor	3.8	3.5	23.4	0.25	-	0.21
Second floor	2	3.7	6.5	0.25	4.4	-
workshop	1.3	2.1	0.24	0.3	42.3	-
NC R	0.6	0.7	2.8	-	4.4	-

Table 1- Total Connected Load for different Usage in kWh

The floor wise load consumption of all electrical equipment such as light, fan, computer, motor, printer, AC & Xerox machine etc .From the following load consumption motor consumes the maximum load and printer and projector consume minimum load. The table shows total connected load of institute. The light and fan are continues load. The entire load is in kWh. In the ground floor consists of civil and mechanical engineering department, first floor consists of computer engineering and MBA department, second floor consists of electrical and electronic and telecommunication department.

Phase wise over all load:

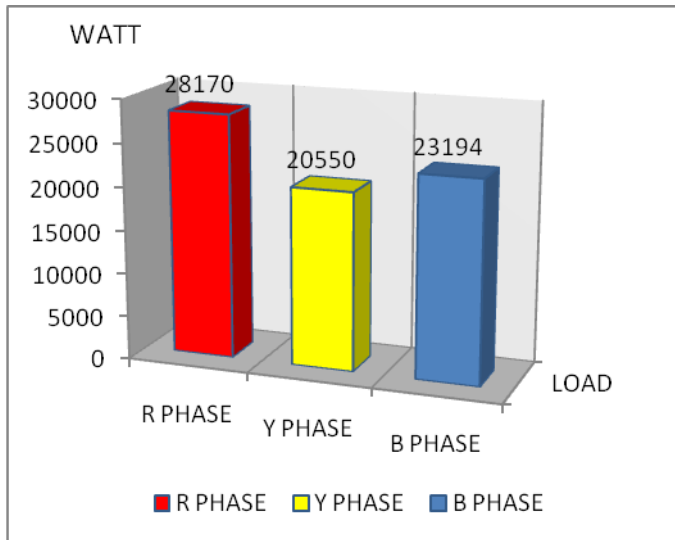


Figure 5- phase wise over all load

The figure shows the phase wise load consumption of AMGOI. From that analysis R phase having maximum load and Y phase having minimum

load. For balancing the load on three phase some load on R phase is added to the Y phase.

V. Wiring diagram:

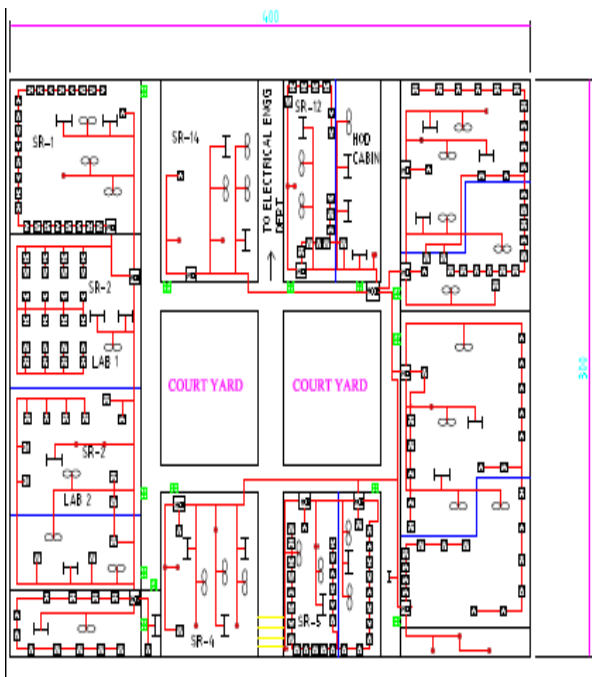


Figure 6- wiring diagram of electronic and telecommunication department

Figure shows wiring diagram of electrical and telecommunication engineering department. Similarly in this way the wiring diagram of other department is carried out.

VI. Conclusion:

This paper focus on the basic concept, need of energy audit and steps involving the energy audit of AMGOI. After analysis of load distribution is done in institution wiring diagram has been drawn in AUTO-CAD software. Also after checking phase wise load distributions.

VII. Reference:

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BIOGRAPHIES:



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